REMARKS

The amendments to Claim 1. a) are supported by the Specification, page 6, lines 17-18. The amendments to d)ii) and d)iii) and in the proviso a), b), d), and e) are for clarity in that the now claimed compounds are only monosubstituted and must contain a cyclic group G.

Rejection under 35 USC §112(1)

Claim 1 is rejected under 35 USC §112(1) in that the amendments made to disclaim the compounds disclosed by Baird, *Tetrahetron Letters*, Vol. 36, No. 52, pp. 9541-9542 (1995) are considered new matter and are a negative limitation to the claim.

The present amendments to Claim 1 have made this rejection moot in that the compounds disclosed in Baird are no longer included in the scope of the claims.

Rejection under 35 USC §112, First Paragraph Scope of Enablement

Claim 1 is rejected under 35 USC §112, First Paragraph, in that the Specification does not reasonably provide enablement for all the compounds as claimed. The factors to be considered in determining whether a disclosure meets the enablement requirement are those of *In re Wands*, 8 USPQ2nd 1400 (Fed. Cir. 1988) specifically: The nature of the invention; The predictability or unpredictability of the art; The breadth of the claims; The amount of direction of guidance presented; The presence or absence of working examples; and The quantity of experimentation necessary.

Applicants contend that each of these factors, in fact, have been met by the disclosure of the instant application. Specifically:

(1) The nature of the Invention - The presently claimed invention is drawn to a cyclopropene compound which contains a very large Markush group of substitutents. This large group of substituents are, in fact, not as broad as the first appear. Applicants have discovered a group of substitutents which provide cyclopropene compounds with ethylene inhibitory activity that were not previously disclosed in the art. Applicants are entitled to claim the full scope of those new compounds.

(2) Predictability - It is known within the art surrounding cyclopropene compounds that certain of them may have ethylene inhibition activity when contacted with plants or plant products. Many of these effects are documented in the references cited in applicant's Information Disclosure

Statements. What was not known from those prior disclosures was the breadth of substituent groups which would provide the cyclopropene compounds with this activity. Applicants have discovered that the scope of active compounds goes far beyond those disclosed in the cited references. Applicants are not relying on a single, or a few, species in which to base the breadth of their claims. Rather, Applicants have shown through the eighty-six example compounds tested that a wide variety of compounds with widely varying substituents are active. These example compounds support the fact that within classes of substituent groups one skilled in the art can predict that certain compounds which are members of those classes will be active. Applicants are not required to present any examples at all, and the C.C.P.A. has stated that the claims may be supported "either by the use of illustrative examples or by broad terminology." *In re Marzocchi*, 439 F.2d at 223 (C.C.P.A. 1971). Applicants respectfully submit that the teachings of their application provide the required support for the claims.

(3) Breadth of Claims - Admittedly, the claims of the instant application are broad. However, Applicants have provided a large number of example compounds (eighty-six) which: "...differ radically in their properties..." and which are demonstrated in the test results in the Specification, Table 3, pp 70-72 to "accomplish the desired result." These results amply demonstrate that the compounds included in the claims are capable of accomplishing such results.

(4) Amount of Direction or Guidance Presented - The Office Action in states that there is no guidance or direction presented to enable one skilled in the art to make any one of the thousands of cyclopropene compounds as claimed. However, there are fifty-six working example compounds and an additional thirty which are described. Extensive methods of synthesis are provided in the Specification, page 12, line 26 to page 16, line 2 and in the Examples, page 16 to page 64. With the information provided, one skilled in the art of organic synthesis would be able to develop specific methods to synthesize any one of the claimed compounds without undue experimentation. One skilled in the art of organic synthesis would also be well schooled in obtaining, or synthesizing, required starting materials to utilize in the cyclopropene syntheses. All of this can be accomplished without undue experimentation on the part of the chemist.

(5) Presence or Absence of Working Examples - The Office Action states that there are no examples presented to enable one skilled in the art to make any one of the thousands of cyclopropene compounds as claimed. As noted above, there are presented in the specification a

reasonable number of working examples and references to a large number of synthesis methods. The working examples include a large number of substituent groups which contain heterocyclic ring groups, each of which show the desired biological activity. These are sufficient to enable one skilled in the art to synthesize the claimed compounds with the expectation that they will provide the desired biological activity.

(6) The Quantity of Experimentation Necessary - The Office Action states that there is no guidance and/or direction provided by the Applicants for the wide variety of compounds and their preparation and method of use. However, as noted above, eighty-six example compounds are provided with the results of their use. Applicants are now only claiming a limited class of those compouds, those with only a single substitutent group. These data are presented in the synthsis examples (Specification, page 12, line 26 to page 16, line 2 and in the Examples, page 16 to page 64, and the test data presented on pp 69-72). The Office Action does not present facts to support the assertion that "undue experimentation" would be required to practice the present invention. Rejection of claims as being non-enabled requires "the Patent Office, whenever a rejection on this basis is made, to explain why it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning" refuting the asserted teaching of the invention. *In re Marzocchi*, 439 F.2d 220, 224 (C.C.P.A. 1971). The Office has not met its burden to provide such evidence or reasoning. "However, specific technical reasons are always required." M.P.E.P. § 2164.04. The rejection merely states that there are not "sufficient working examples" to support the claims. However, Applicants are not required to present any examples at all, and the C.C.P.A. has stated that the claims may be supported "either by the use of illustrative examples or by broad terminology." *In re Marzocchi*, 439 F.2d at 223. Applicants respectfully submit that the broad teachings of their application provide the required support for the claims. The mere assertion that there is not "a sufficient number of compounds to support the relatively broad claims" has been rejected previously by the Board of Patent Appeals and Interferences, which reversed such an enablement rejection as "not supported by evidence, facts or sound scientific reasoning." *Ex parte Reese*, 40 U.S.P.Q.2d 1221 (B.P.A.I. 1996).

Rejection under 35 USC §103(a)

Claim 1 is rejected under 35 USC §103(a) as being unpatentable over Sisler, E. (US 6,194,350), Daly, et.al. (US 6,017,849), and Minkin, et.al. *Journal of Molecular Structure*, 398-399 (1997) pp. 237-253 in that each of the references teaches cyclopropene derivatives and methods of blocking ethylene receptors in plants.

In the broadest sense, each of the cited references teaches cyclopropene derivatives. However, only Sisler and Daly teach methods of blocking the ethylene response in plants. Even though Sisler teaches extensive substitution on the cyclopropene ring, those substitutents are, in fact, quite limited in scope. Sisler teaches that the substituent groups are **linear or branched chain**...C_6 - C_{20} alkyl, alkenyl, or alkynyl...and may include compounds in which one or more of the carbons is replaced by heteroatoms...or where such chains include halogen, amino, alkoxy, carboxy, alkoxycarbonyl, or hydroxy substituents. Daly teaches similar substituents to those taught by Sisler, except that Daly's substituent groups are much smaller and even more limited in scope (i.e. C_1 - C_4 alkyl, hydroxy, halogen, C_1 - C_4 alkoxy, amino, and carboxy, See Daly, col. 6, lines 30-32). Neither Sisler nor Daly, either alone or in combination, teach, disclose, or suggest substituents which contain Applicants' carbocyclic or heterocyclic ring systems. In fact, the disclosures of Sisler and Daly would suggest to one skilled in the art that linear chains are preferred (see Sisler, col. 2, lines 45-46 "Alkyl groups of the present invention are preferably linear and saturated." and Daly, col. 6, lines37-41 "The preferred compounds capable of inhibiting the ethylene response in plants ...are cyclopropene and dimethylcyclopropene."). Thus, Sisler and Daly, in combination, direct one skilled in the art away from Applicants' carbocyclic and heterocyclic rings and toward linear and saturated substituent groups.

Minkin presents a completely different problem and solution from those addressed by Sisler and Daly. Sisler and Daly relate to the use of cyclopropenes to inhibit the ethylene response in plants while Minkin relates to computational modeling of the mechanisms of circumambulatory rearrangements of main-group migrants (that is, substituents) in the cyclopropene ring. There is no disclosure, teaching, or suggestion of biological activity of any kind in Minkin. Minkin is concerned with the various mechanistic factors related to substituent group migrations in the cyclopropene ring and comparison of those factors with substituent group

migrations in cyclopentadienes (see the Abstract; page 238, first full paragraph; page 251, Conclusions). In addition, Minkin does not actually disclose the synthsis of any compound discussed. Rather, the reference is limited to computational modeling of hypothetical compounds (see the Abstract; page 238, first column, line 22 to end of paragraph; page 238, Methods; page 239 first column, lines 8-11; page 243, first column, lines 18-21; page 247 first column, lines 4-7 and second column). Therefore, Minkin should not be considered as being an enabling reference as it does not describe the synthesis of any particular cyclopropene nor their use for any purpose other than computational, mechanistic studies. It is still Applicants' position that Minkin is not a valid reference for obviousness, either alone or in combination with '350 and '849. However, Minkin does disclose a theoretical cycloproene substituted with a phenylthio group. Again, however, one skilled in the art, with knowledge of Minkin, Sisler, and Daly, would not be directed to the synthesis of cyclopropenes containing carbocyclic and/or heterocyclic rings in light of the preferences in Sisler and Daly for linear, saturated substituents.

One skilled in the art would conclude, therefore, that there is no disclosure, teaching, or suggestion in Sisler, Daly, or Minkin, either alone or in combination, that would motivate such a person to synthesize cyclopropenes substitued with substitutent groups containing carbocyclic and/or heterocyclic rings with the expectation that such compounds would provide inhibition of the ethylene response in plants.

Provisos in the Claim

The Examiner has requested information regarding the prior art which has been disclaimed by the proviso. The disclaimed prior art includes the following: Minkin (described above); Ryu, et.al., *J. American Chemical Society*, 1990, 112(19), pp. 7061-7063 and Kamienska-Trela, et. al., Magnetic Resonance in Chemistry (2002), 40(10), 640-646 (trimethylsilyl); Gosse, et. al., Canadian Journal of Chemistry (2004), 82(11), 1589-1596 (thiol); Yet, L., Dissertation Abstract Int., B 1995, 6(6), 3208 (phenylsulfonyl); Weber, et.al., Helvetica Chimica Acta (1989), 72(1), 29-40 (phenylthioethyl); Malek, J., Organic Reactions (Hoboken, NJ, United States (1988), 36 (diphenylhydroxymethyl); Albertson, et.al., US 3,898,235 (benzo[g]quinolin-7-ol-1-methyl); and Paredes, et.al., Revista Latinoamericana de Quimica (1985), 16(2-3), 94-8 (malonates). These references were not considered material to patentability

by the inventors in that they disclose reaction pathway studies, physico-chemical studies, or compounds used for purposes much different than the uses envisioned by the inventors for their claimed compounds.

Rejection under 35 USC §103(a) - Second Rejection

Claim 1 is rejected under 35 USC §103(a) over Baird, et.al., *Tetrahedron Letters*, Vol. 36, No. 52, pp. 9541-9542 (1995) in that Baird teaches an unusual rearrangement of 1-allyl and 1-benzylcyclopropenes.

Baird is much like Minkin (see above) in that Baird is directed toward studies of rearrangements in certain specifically substitued cyclopropene rings (i.e. allyl and benzyl substituents). The purpose of Baird's studies is to provide a method to protect the strained cyclopropene ring (see p. 9541, first paragraph) and as a possible applicable route to prepare 1,2-disubstituted bicyclo[1.1.0]butanes (see p. 9542, end of last paragraph). There is no disclosure, teaching, or suggestion in Baird that would motivate one of ordinary skill in the art to prepare allyl and/or benzyl substituted cyclopropenes with the expectation of obtaining a compound that would inhibit the effect of ethylene on plants. There is no disclosure, teaching, or suggestion in Baird of any biological activity of any kind with respect to the compounds disclosed.

With this amendment and response, Applicants believe that the prior rejections have been overcome and, even in light of the new reference, the claims are in condition for allowance. Should the Examiner have any suggestions which may put the Application in better condition for allowance, Applicants' attorney is willing to discuss any such suggestions either by phone or at the U. S. Patent and Trademark Office.

Respectfully submitted,

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